K. V. Krombein

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ENTOMOLOGICAL NEWS

VOL. XLIX. MARCH, 1938 No. 3

Two Philosamia cynthia Pupae in one Cocoon (Lepid.: Saturniidae).

By C. BROOKE WORTH, Dept. of Biology, Swarthmore College, Swarthmore, Pennsylvania.

I found an unusual cocoon of *Philosamia cynthia,* which contained two pupae, in a vacant lot in the heart of Philadelphia, Pennsylvania, sometime in February, 1937.

So compactly was the cocoon spun that I did not suspect at first that it was anything more than a large "normal" one, probably containing a female pupa. But I was led to suspect something unusual when, on weighing it, I found that its total weight was 7 grams. In a study of weight loss in cocoons of this species (during the course of their slight hibernating metabolism), I had found that male *cynthia* cocoons average 3 grams in weight, and female cocoons average 4 grams. To find a cocoon weighing exactly the same as the sum of the average of both sexes was certainly suggestive of something unusual, especially as the largest female I had found to date weighed only slightly over 5 grams.

External examination of the cocoon did not reveal any great abnormality. There was a clearly defined exit where the cocoon was suspended by its strap. However, I could detect a slightly looser texture in the weaving at the side opposite to the strap.

For the rest, the external aspect of the cocoon gave no evidence whatsoever of its double occupancy; in cross-section it was perfectly circular, with no detectable indentation at any point.

On cutting the cocoon open, I found two pupae, each one oriented with its head toward one of the suggested outlets of the cocoon. The inner wall of the structure was perfectly smooth. There was no trace of a septum between the pupae. The wall of the cocoon was not thicker than normal.

The pupae were male and female. The male occupied the lower position. Examination of these two pupae revealed that they were both of normal size, and each seemed vigorous and healthy. The male, however, was markedly compressed.

This condition indicates that the female was the first to pupate, accomplishing this sufficiently in advance of the male to have hardened into the normal inflexible contour while the male was still soft.

It is likely, I think, that this cocoon would have yielded two normal moths, no matter in which order they hatched; even if the male had matured first, there appeared to be room for him to squeeze past the female and come out of his own "front door." The specimen seemed of sufficient interest, however, to preserve, and it is now in alcohol, in the possession of the Department of Entomology of the Academy of Natural Sciences of Philadelphia.

I do not believe that there was any sexual "design" in the two caterpillars' spinning a joint cocoon. They were more than likely brother and sister, though this would not, of course, exclude the possibility of their future mating. It is more likely, however, that the cocoon was the result of accident. The two caterpillars, of the same age, on the same tree (which was, incidentally, only a small sapling), felt the urge to spin simultaneously and happened to choose the same site for their spinning.

Gene Stratton-Porter records in her "Moths of the Limberlost" the finding of two cecropia cocoons (*Samia cecropia*), spun side by side so as to be slightly interwoven. Remarkable as it may seem, these cocoons contained male and female individuals respectively, and the imagines emerged *simultaneously*, as proved by the execllent photographs which she took.

One is almost forced to regard this occurence as a provision for the mating of individuals, though it is hard to credit caterpillars with such a profound degree of instinctive foresight. And now my *cynthia* cocoon adds a jot of evidence to such a hypothesis, if, indeed, there is any one sufficiently credulous to be interested in such speculations.

Notes on some North American Mydaidae (Diptera)

By MAURICE T. JAMES, Colorado State College, Fort Collins.

Recently, I sent a small collection of Mydaidae to Dr. J. Bequaert for determination, and, after making identifications, pointing out a new species, and making some observations on the collection, he asked me to publish the results. I am greatly indebted to him for his generosity.

Nomoneura micheneri, new species.

♂. Head black in ground color, clothed with dense, white, semi-appressed pile on the occipital orbits, the face, and to each side of the antennae, and with similar, but less dense and more erect, pile on the upper part of the front and on the vertex; this pile is somewhat longer than the combined length of the first and second antennal segments. Antennae black, except the bulbous fifth segment, which is orange-yellow; the first segment twice as long and thick as the second, clothed sparsely with long black and pale hairs mixed; third segment, slender, cylindrical, almost half the length of the entire antenna; the fourth segment approximately the length of the second; the fifth expanded bulblike, its greatest width being preapicad; the antennae elbowed at the apex of the third segment. Proboscis black, slender, extending approximately to the apex of the antennae.

Thorax black, shining, with dense conspicuous, white pile which covers the humeri and the following areas on the dorsum: the lateral margins, the anterior margin, except the median third, and a partial stripe on each side, extending backward almost to the suture and just outside the median third; this pile is appressed, except that on the humeri, which is semi-appressed; a similar area of semi-appressed pile occurs below each wing base, and there is a small tuft of it at the base of the scutellum. Posterior calli somewhat elevated. Halteres black. Legs black, the knees and tarsi brownish. Wings hyaline; the first posterior cell closed.

Abdomen black ventrally on the first six segments; the first and second entirely black, the third to sixth inclusively reddish dorsally, their lateral margins and narrow apices, however, black; genitalia mostly reddish. First segment with a considerable amount of rather long semi-appressed whitish pile; the second segment with a basal tuft of appressed whitish pile on each side; the remaining segments with inconspicuous black appressed pile on the disc and with conspicuous silvery tufts

at the posterior corners. Length, 10 mm.

♀. Similar to the male, but the pile is much shorter and sparser, the dense covering of the head being especially reduced; on the abdomen the segments beyond the first are practically devoid of pile dorsally. The pile of the thoracic dorsum is similar to that of the male, but more reduced in area. Tibiae and genitalia brownish, the latter with four spines on each side. Antennae broken off at end of second segment.

Holotype ♂, *allotype* ♀, on one pin, taken in copulation, seven miles south of White Water, Riverside County, California, April 13, 1935 (C. D. Michener).

Of the species included in Johnson's key to *Leptomydas*, three evidently belong to *Nomoneura*, as defined by Curran in his "North American Diptera." These three, *hirta* Coq., *concinna* Coq., and *venosa* Loew, together with *micheneri*, are the representatives of this genus in the United States. *Micheneri* has a longer proboscis than the other species, and the coloration of the abdomen is quite different; the abdomen of *venosa* ♀ is entirely pale, while those of *venosa* ♂, *hirta*, and *concinna*, are banded with black and yellow.

PHYLLOMYDAS BRUSEI Johnson. ♂, foothills west of La Porte, Larimer Co., Colorado, July 22, 1935 (M. T. James). On sage brush. This specimen was compared with the type by Dr. Bequaert, who informs me that it has been recorded only from the type locality, Galveston, Texas.

I have the following records for other Mydaidae, all determined by Dr. Bequaert.

MYDAS MACULIVENTRIS Westw. Miami, Florida, Aug. 6, 1934 (Frank N. Young).

M. MACULIVENTRIS var. INCISUS Macq. Miami, Florida, Aug. 9, 1934 (Young); Coconut Grove, Fla., June 18, 1934.

OPOMYDAS CARBONIFER O. S. Lloyd, Jefferson County, Florida, Aug. 9, 1935 (G. Fairchild).

NOMONEURA VENOSA Loew. Globe, Arizona (Duncan); Roggen, Colorado, Sept. 8, 1933 (M. T. James); between Trinidad and La Junta, Colorado, Aug. 8, 1933 (H. G. Rodeck, M. T. James). The latter specimen was taken, in rather good condition, from the radiator of our car.

Notes on Western Conifer Aphids (Homoptera: Aphididae).[1]

By G. F. KNOWLTON and CLYDE F. SMITH.

The following report adds to the known distribution of several conifer aphids, two species and a sub-species being described as new[2].

CINARA BREVISPINOSA (G. and P.). On *Pinus contorta* twig bark at Boise, Idaho, July 16, 1936 (T. O. Thatcher).

C. CURVIPES (Patch). On Engelman spruce at Pingree Park, Colorado, August 21, 1935 (G. F. Knowlton).

C. FERRISI (Swain). On *Pinus albicaulis,* Moose Green, near Karsts' Ranch, Montana, July 8, 1936 (Thatcher).

C. GLEHNA (Essig). On *Picea pungens* twig bark at Salt Lake City, Utah, June 12, 1935 (Knowlton).

C. HOTTESI (G. and P.). On twig bark of *Picea engelmannii* at Pingree Park, Colorado, August 21, 1935 (Knowlton: M. A. Palmer).

C. MEDISPINOSA (G. and P.). On young twig bark of *Pinus contorta* at Boise, Idaho, July 6, 1936 (Thatcher,), and Beaver Creek, Logan Canyon, Utah, July 25, 1837 (C. F. Smith: C. K. Smith).

C. MURRAYANAE (G. and P.). On twig bark of *Pinus contorta* at Boise, Idaho, July 6, 1936; and Mountain View Peak, Rogerson, Idaho, May 12, 1936 (Thatcher).

C. OCCIDENTALIS (Davidson). On twig bark of *Abies lasiocarpa,* Minidoka National Forest, Idaho, May 31, 1935 (Thatcher).

C. PINI (L). On *Pinus sylvestris,* Campus, Utah State Agricultural College, Logan, Utah, July 26, 1937 (Smith: C. J. Davis).

C. PONDEROSAE (Williams). On *Pinus ponderosa* twig bark west of Meaw Meadows, Idaho, June 13, 1936 (Thatcher); Yellowstone National Park, Wyoming, July 18, 1936 (Knowlton); Gallatin Valley, Montana, July 14, 1936 (Knowl-

[1] Contribution from the Department of Entomology, Utah Agricultural Experiment Station. Authorized by the Director.

[2] The writers are indebted to Professor M. A. Palmer for her opinion concerning various species herein recorded.

ton); and Nederland, Colorado, August 23, 1935 (Knowlton).

C. SIBIRICAE (G. and P.). On *Juniperus sibirica* at Pingree Park, Colorado, August 21, 1935 (Knowlton).

Cinara thatcheri n. sp.[3]

Alate vivipara.—Size 4mm. long and 1.75 wide through eyes; ocular tubercles present; antennae 1.61 long; antennal III, 0.57 to 0.6 mm. long with 3 to 6 sensoria; IV, 0.25 to 0.28, with 1 to 3 sensoria; V, 0.3 to 0.33, with 1 secondary sensorium; VI, 0.153 to 0.16 + 0.047 to 0.05; last three segments of acute rostrum measuring 0.21 to 0.22, 0.28 to 0.3, and terminal segment 0.11; hind tibiae 2.83 to 2; hind tarsi 0.395; cornicles 0.3 to 0.46 across longest part of base; dusky patches occur on the two dorsal segments preceding the cauda; small, dusky spots partly surround spiracles and occur on other dorsal segments.

Apterous vivipara.—Size 4.5 mm. long 2.4 wide through abdomen and 0.78 through eyes; antennae 1.6 to 1.65 mm. long; antennal III, 0.53 to 0.634, without sensoria; IV, 0.25, with 1 sensorium; V, 0.285 to 0.32 with 1 secondary sensorium; VI, 0.146 to 0.155 + 0.047 to 0.05; penultimate segment of rostrum 0.29 to 0.3 mm. long; rostrum reaching nearly to end of abdomen; hind tibiae 2.6 to 2.83 hind tarsi 0.36 to 0.39; cornicle 0.4 mm. across base longest way.

Collections.—On *Pinus ponderosa* at White Bird Summit, IDAHO, June 13, 1936 (T. O. Thatcher).

Taxonomy.—Professor M. A. Palmer called the writers' attention to the fact that the sub-terminal segment of the rostrum in *Cinara thatcheri* is noticeably longer than is the case in its near relative, *Cinara schwarzii* (Wilson), in which it is 0.2 to 0.23 mm. long; also antennal V always is longer than IV.

C. TAXIFOLIAE (Swain). On twig bark of *Pseudotsuga taxifolia* at Antelope Flat, near Ashton, Idaho, July 18 and 27, 1936 (Thatcher).

Cinara utahensis n. sp.

Apterous vivipara:—Color brownish-black, shiny; body 4.5 to 4.72 mm. long and bearing hairs 0.06 to 0.07 mm. long on abdomen; vertex hairs 0.10 to 0.12; hairs on antennal III, 0.04 to 0.06; antennae 2.2 to 2.3 mm. long; antennal III, 0.78 to 1.04 mm. long and bearing 1 to 3 sensoria; IV, 0.28 to 0.35 bearing 1 to 2 sensoria; V, 0.37 to 0.45 with 1 sensorium;

[3] Types of new species are deposited in the U. S. National Museum. Paratypes in the G. F. Knowlton and C. F. Smith collections.

VI, 0.125 to 0.14 + 0.065 to 0.10 mm.; rostrum attaining cornicles; rostral IV + V, 0.33 to 0.37; hind tibiae 3.76 to 4.6 mm. long and bearing pointed hairs 0.096 to 0.117 mm. long; first joint of hind tarsi 0.06 to 0.08 mm. on the outer side, 0.16 on inner side; second joint 0.34 to 0.37; cornicles 0.53 to 0.61 mm. across base.

Alate vivipara:—Antennal III, bearing 9 to 12 sensoria; antennal IV, 2 to 3 sensoria; hairs on vertex 0.08 to 0.09;

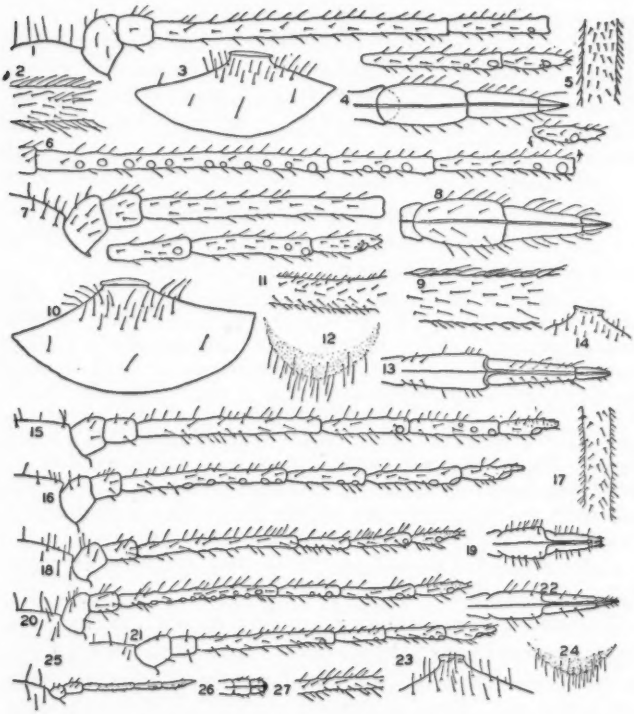

Fig. 1. *Cinara utahensis* n. sp. Aptera, 1-4; alate 5-6. *C. utahensis zoolathridi* n. subsp. Aptera, 7-10. *C. thatcheri* n. sp. Aptera, 11-15; alate, 16-17. *C. taxifoliae* (Swain). Aptera 18-19; alate, 20. *C. brevispinosa* (G. and P.). Aptera, 21-24. *Essigella fusca* G. and P. Aptera, 25-27.

hairs on hind tibiae 0.045 to 0.047; other characters as in apterous vivipara.

Taxonomy.—This species differs from *C. coloradensis* (G. and P.) in diameter of cornicles being greater; tibial hairs longer and less rigid, these being longer than one-half the diameter of the hind tibiae; and in having a secondary sensorium on antennal *V*. *C. utahensis* differs from *C. curvipes* (Patch) in having fewer sensoria on apterous antennal III, and averaging more secondary sensoria on antennals IV and V; in tibial hairs being longer (more than half the diameter of the joint) and pointed; hind tarsi being more than 0.1 of hind tibiae. This species runs to *C. edulis* (Wilson) in Gillette and Palmer's key (Ann. Ent. Soc. Amer. 24: 844) from which it differs in angle of hairs on hind tibiae being less than 45 degrees; and in being a larger species.

Collections:—On *Abies lasiocarpa* in Smithfield Canyon, UTAH, July 18, 1937 (W. P. Nye: C. J. Davis).

Cinara utahensis zoolathridi n. subsp.

Apterous vivipara.—Body reddish-brown, 3.7 to 5.4 mm. long; antennae 2 to 2.5 mm. long; antennal III, 0.8 to 0.92 mm. long and bearing 0 to 2 sensoria on distal half; IV, 0.29 to 0.35 mm. with 1 to 2 sensoria near distal end; V, 0.41 mm., bearing 1 to 2 secondary sensorium near distal end; VI, 0.15 to 0.16 + 0.063 to 0.082; rostrum lance-like, usually surpassing cornicles; rostral IV + V, 0.34 to 0.38 mm.; hind tibiae curved, 4 to 5 mm. long, bearing numerous thin hairs 0.062 to 0.086 mm. long; first joint of hind tarsi 0.09 on the inner side and 0.19 on the outer side; second joint 0.39; cornicles 0.35 to 0.42 mm. in diameter across base.

Collections.—On spruce trees in nursery, Portland, OREGON, 1934 (C. Chamberlin).

Taxonomy:—This sub-species differs from *C. utahensis* n. sp. in having slightly shorter hairs on vertex; hairs on antennae being less spine-like; and in having thicker antennae and hind tarsi. From *C. curvipes* (Patch) it differs in base of VI being shorter; wider base of cornicles; and hairs on hind tibiae being longer, thinner and less blunt.

SCHIZOLACHNUS FINI-RADIATAE (Davidson). On needles of *Pinus ponderosa* in Dixie National Forest, Utah, August

10, 1936 (Knowlton: C. F. Smith).

ESSIGELLA FUSCA G. and P. On *Pinus* needles at Heron Creek, Wyoming, July 18, 1936 (Knowlton); and Pingree Park, Colorado, August 19, 1936 (Knowlton).

Description of and Notes on the Early Stages of Hyloicus canadensis Bdv. (Lepidoptera: Sphingidae).

By WALTER J. CLAYTON, Lincoln, Maine.

The following descriptions were made of larvae from eggs laid by three female moths taken at Lincoln, Maine, by myself. The first was taken at 1 A. M. on June 30, 1937, at a street light. She laid a few eggs that night and a total of 110. The larvae emerged on July 5th. The second moth laid only 19 eggs and the third 118. This last female seemed less vigorous than the others and many of the larvae from her batch of eggs did not survive moulting.

The newly-hatched caterpillars ate most of their eggshells after emerging. Those of the first brood grew to maturity and stopped eating 21 days after hatching, and on July 26th began to roam around, considerable moisture exuding from the first three or four segments. The larvae from the eggs of the second and third females went through their development in exactly the same length of time.

The larvae from the first mentioned brood had a large number of the red-colored examples in it, and the second and third lots were inclined to be rather dark, merging into reddish brown markings, but, like the others, lost most of the dark color in the last stage.

The caterpillars were quite frail and had difficulty in passing the first moult in which many died, but those which survived had little trouble in passing the other moults. It was necessary, however, to rear the larvae singly.

The larvae from the first brood were, on the whole, a brighter sort of reddish-rust color and were much brighter than the caterpillars of the other two broods. In the end, though, the caterpillars of all three broods were much alike in color with white back, green sides and reddish shades showing faintly in some.

When they stopped feeding, the caterpillars were placed in a box of dirt to which a cover was fastened with nails. This cover had a hole cut in the top of it. through which the larvae were dropped when they were ready to pupate. The interior of the box was dark and most of the caterpillars pupated under and among leaves scattered on top of the soil. A few burrowed into the earth one or two inches. They walked around the box sometimes for two or three days before becoming quiet. Few caterpillars were lost during this period. After three or four days some had shed the larval skin, but others were a week in doing this.

The moths are on the wing from the last week in June and some have been taken as late as the first week in August. A total of seven was taken this year. Although several years of collecting in Lincoln has yielded from three to seven moths annually, no female has been taken until this year, and no larva has ever been found in the wild state.

Egg. The eggs were pale green, much like that of *H. chersis* Hbn., but only about half as large. They hatched five days after deposition.

Larva. The larvae, at hatching, were 7/32 of an inch in length, very pale yellow to almost white, the caudal horn light, (turning dark in about 15 minutes) straight and held very erect. The caterpillars were given black ash (*Fraxinus nigra* Marsh) and low bush blueberry (*Vaccinium* sp.). They would not touch the blueberry, but after considerable wandering attached themselves to the veins on the underside of the leaves of the ash and soon began to reach out at right angles, first eating only the surface, then a hole through the leaf. The larvae, when a little older, ate a hole and then continued it to the edge of the leaf.

First moult. The first moult occurred five days after hatching. The larvae were 9/32 of an inch in length and up to now very transparent. By holding up to the light and with an ordinary reading glass, pellets of food could be seen passing down to the stomach. A very pale subdorsal stripe on both sides ran from the fourth segment to the caudal horn. Seven pale oblique stripes on the sides came out of the subdorsal stripes and a pink spot was situated above the oblique and below the subdorsal. These became more conspicuous before the next moult.

Second moult. This occurred 5 days later, and the caterpillars were ¾ of an inch or slightly more in length. Considerable changes took place now and before the next moult. About half of the lot looked much like *H. chersis* in some ways, the rest were decked out in rust-red, reddish brown, and some were nearly chocolate brown. They varied considerably in brightness and in amount of color, but all were much whiter than *H. chersis* on the back. The first three segments were pale green dotted with white granulations, the remainder of the body beneath and half-way up the sides was pale green with white dots like *H. chersis.* The head was triangular, considerably notched at apex, and green with yellow vertical stripes. The caudal horn was reddish or brown at tip and somewhat curved. It was darker basally and in some larvae the last two segments were rusty, brownish, or reddish. Some had oblong reddish spots above the subdorsal stripe. Most of the rust or reddish markings were edged with very pale yellow. The terminal segment was much dotted with raised black spots. The spiracles were rose, edged with pale yellow. The colors became brighter as the caterpillars neared the next moult. Two larvae were very dark green, like the greenest type of *H. chersis.*

Third moult. Five days after the preceding moult this one occurred. The larvae were 1¾ inches in length, and were little changed in color although some were brighter than in the preceding instar, and a number had lost most of the reddish markings. Most, however, were the green, white-backed type and were largest from about the middle of the body to the caudal end, and tapered from the middle to the small head. The head was not as much notched as in the preceding instar, and the caudal horn, while it had previously shown a tendency to droop, was now pointing nearly straight out behind.

Full-grown larva. The full grown larvae may be described as follows: Length 2½-2¾ inches; the first three segments, the under parts and the lower part of the sides were all light green dotted with white granulations. The head was deep green with pale yellow vertical stripes on the sides, triangular, and somewhat notched at the apex. The legs were the same as in *H. chersis.* The upper part of the body was nearly white. The seven oblique stripes were slightly yellow at the lower end, becoming whiter than the dorsum at the upper, and were edged above with sharply contrasting dark green. The obliques crossed one segment and two-thirds or more of the next, and some larvae showed some of the washed-out reddish color of the second instar. The caudal horn was green, tipped with reddish or

brown. curved and heavily spiked with black spines located mostly in front and in back. The last segment was green dotted with raised, black granulations. The spiracles were rose-red edged with pale yellow.

In this stage the following should distinguish it from *H. chersis*: much like *H. chersis* but smaller (2½-2¾ inches as against 3½-4 inches in length for *H. chersis* and less than half the diameter). The caudal horn is grass green, never bluish or yellowish as in *H. chersis*. While there was considerable variation in colors, all the larvae were very white on the dorsum, never bluish or yellow, and the terminal plates had raised black dots (granulations). It should be clearly understood, moreover, that while the larva of *H. canadensis* has been compared with that of *H. chersis*, the two are not to be confused in their red phases. That of *H. chersis* is dull red all over, while that of *H. canadensis* is of spots and blotches of a different shade of red. The latter species also present an almost unlimited degree of variation in the extent and arrangement of spotting, and, if any segments are entirely red, it is only the last three or four with the remainder of the dorsum white as in all the spotted varieties.

Pupa. The pupae are 1 13/32 inches long, ⅜ of an inch in diameter, and are dark brown. A short tongue case is present, humped up in the middle, and touching at the slightly enlarged tip. The pupa is difficult to separate with certainty from that of *H. luscitosa* Clem., and is the same size and color.

Descriptions of some North American Micropezidae (Diptera).

By Ezra T. Cresson, Jr., Philadelphia, Pennsylvania.

The following species were encountered while working on a revosion of the Nearctic species of this family.

Micropeza abnormis new species.

Similar to the European *M. corrigiolata* (Linn.) differing most noticeably in having the antennae pale in both sexes, in the form of the claspers and in the color of the ovipositor.

♂, ♀. Black as follows: Head except face, bucca, lateral and posterior-oral margins; antennae; thorax except areas around coxae; tarsi; abdomen except male genital segments, claspers and first segment of ovipositor. Pale genitalic segments of male with median dark spot. Basal segment of ovipositor reddish to yellowish. Coxae, femora and tibiae pale except a disto-median and apical flexor spots on femora, and

apices of tibiae. Palpi and wing veins dark. Arista white; halteres pale.

Thorax and abdomen more or less cinerous but never densely so. Otherwise surfaces more or less shining; the face with usual silvery reflection.

Head relatively stout, almost as high as long (as 27:30); the postorbital swelling about .3 length of head. One notopleural bristle; no pectoral pile or pile on posterior surface of hind femur. Marginal setae on tergites and sternites not conspicuous but discernable in the female sex.

Claspers situated distad close to genital segments, small, scarcely as long as length of tergite V, turgid, their apices rather knob-like, curving mesad hood-like; their cephalic surface sparingly black pilose. Second vein almost straight in entering costa; third costal section .25 length of ultimate of vein IV; first posterior cell closed or nearly closed in margin.

Length: 4-4.5 mm.

Type.—Male; Baboquivari Mountains, ARIZONA, (R. H. Beamer; July 19, 1932), [Kans. Univ. Colln.]. *Paratypes*.—5 ♂, 4 ♀; with same data.

Micropeza compar new species.

Structurally similar to *Micropeza turcana* Townsend (1892); but paler in color, and antennae of the male yellow.

♂. Pale species, with black to ferruginous as follows: Ocellar spot, broad lateral margins of vertex attentuated to foramen, median line on mesofrons, small foveal spot; four antesutural lines, the lateral one abbreviated cephalad but extending postsuturally, a paler median postsutural line extending onto scutellum, broad pleural band and metanotum. Tergites more or less brownish except at margins, the usual sinstral black spot on genital segment distinct. Arista black. Femora with more or less distinct disto-median extensor spot and their apices dark; apices of tibiae and all tarsi, black.

Head robust about 1.5 longer than high; pectoral and hind femoral pile very sparse; claspers large, broad, easily attaining base of abdomen, with apical fingers comparatively but slightly curved.

♀. Similar to the male but darker; antennae showing some infuscation but never intensely black and the third always pale at inferior margin; dark markings somewhat more extensive and the tergites showing very narrow pale margins; ovipositor segment dark basally.

Length: ♂, ♀ exclusive of ovipositor, 6 mm.

Type:—Male; Huachuaca Mountains, ARIZONA, July 8, 1932,

(R. H. Beamer). [Kans. Univ. Colln.]. *Paratypes.*—1 ♂; 2 ♀; topotypical. 3♀, Chiricahua Mountains, July 8, 1932; and 1 ♀, Santa Rita Mountains, Arizona, July 7, 1932; (all R. H. Beamer).

Micropeza atra new species.

Although the male of this species is unknown, I suspect, from the general habitus of this female that we have a species of the *turcana* group, and I further suspect that the male will prove to have the genitalic development of this group and that the claspers will be short of the *lineata* type.

I would hesitate to erect a new species on the female sex, but here we find one that is so distinct in having the thorax entirely black and more densely pollinose than is usual with the other species of this group. I cannot consider it a dark variety of *setaventris* because of its lacking the characteristic sternal setae of that species; and I do not think it can be an extreme, dark form of the *turcana* assemblage. It should not be confused with either *abnormis* here described or *nitida* Hennig, both belonging to other species groups.

Black, including antennae and arista, the former of which however may be brownish. Yellow to tawny are: the face, oral margin, mouthparts, prosternum, all coxae, halteres, very narrow apices of tergites. Fore femur black, pale basally; mid and hind femora tawny, darker basally and at extreme apices; tibiae and tarsi black. Wing veins brownish.

Head mostly shining to polished, with the usual cinereous postocellar area and the silvery facial reflections. Mesonotum rather densely cinereous, but not opaque, becoming shining towards humeri; pleura somewhat niveous. Scutellum and notopleura similar to mesonotum. Abdomen sparsely brown pollinose. Ovipositor polished.

Head robust about 1.5 as long as high. One notopleural bristle. Sternites narrow, inconspicuously setose laterally; ovipositor segment about as long as the abdomen. Third costal section about .5 as long as the ultimate of vein IV; first posterior cell open.

Length, 5 mm. excl. ovipositor.

Type.—Female: Flagstaff, Coconino County, Arizona. June 7, (H. S. Barber), [U. S. N. M., no. 27059].

Micropeza setaventris new species.

Similar to *M. turcana* Townsend (1892) but postorbital

region and occiput black as are also the entire mesonotum and lower portion of pleura.

♂, Mostly black with following pale yellow to reddish: frontal orbits above; narrow area around ocelli; face, oral margin, notopleural stripe, supra-alar margin of mesonotum, pectal margin of sternopleura and halteres; more or less of abdomen beyond tergite II and claspers; coxae and legs except tarsi. Apical flexor spot on femora and apices of tibiae are dark.

Head robust, about 1.5 as long as high; claspers short, not nearly attaining base of abdomen, very strongly setose apically; hind femora with some flexose pile on posterior surface.

♀. Similar to the male but darker, the pale markings being reduced; abdomen except narrow margins of tergites, black; sternites with lateral margins bearing long setae which are longer than width of sternite, interspersed with smaller setae.

Length, ♂, ♀ exclusive of ovipositor, 2.7 to 4 mm.

Type.—Male; Fort Duchesne, Uintah County, UTAH, June 28, 1937, (G. F. Knowlton), [A.N.S.P. no. 6536].

Partaypes:—1 ♀ topotypical, with same data. 9♂, 11♀; Hooper, Weber County, July 15, 1937 (D. E. Hardy). 1♂; Huntsville, Weber County, July 10, 1937 (G. F. Knowlton). 1♂, 3♀; Smithfield, Cache County, July 11, 1937 (Smith & Harmston). 1♀; Richmond, Cache County, July 2, 1937, (G. F. Knowlton). 1♂; Bingham Canyon, Box Elder County, July 15, (Knowlton & Harmston), all in Utah.

Micropeza texana new species.

Very similar to *M. producta* Walker (1849) but distinct in its trivittate mesonotum.

♂. Yellow to ferrugineous including palpi. Black to brown are: vertex and upper half of postorbital region and occiput except narrowly around ocelli, a narrow line including outer verticals, frons, foveae and antennae (arista pale but not niveous); a median antesutural and two postsutural stripes on mesonotum, the median one continuous narrowly caudad, the others continued broadly cephalad of the suture and attenuated caudad, scutellum except pale apex; pleural line including propleural scale and continuous with the black metanotum; a pectoral line; abdominal tergites except narrow margins; two spots on male genital segment; distomedian and apical rings on femora; broad apices of tibiae and all tarsi. Halteres dark in part.

More or less shining species but mesonotum and particularly

the pleura are distinctly cinereous, almost obscuring the ground color pattern; abdomen as usual somewhat grayish and subopaque. Venation rather dark.

Head slender and elongate, about twice as long as high (as 30: 15); two notopleurals. Tergites II and IV slightly longer than V and VI. Claspers of male similar to those of *producta* but the fingers more slender; styli also similar to those of *producta* but the longer lateral prong is more slender and thornlike. Second vein rather abruptly curving into the costa, apportioning the third costal section to about .3 of ultimate of vein IV. First posterior cell closed and petiolate.

Length, 4 mm.

Type.—Male; Corpus Cristi, Nueces County, TEXAS, (F. C. Pratt; April 13. 1906), [U.S.N.M., no. 27061]. *Paratype.*—1 ♂; topotypical with same data.

Taeniaptera brunneipes new species.

Similar to *Calobata antennaepes* Say, 1823, but darker. Third antennal segment black; the usual disto-medial dark ring of mid and hind femora broader extending almost to base of these members; the mid and hind metatarsus almost as dark as the distal segments.

Type.—Male; Broad Creek, near Washington, DISTRICT OF COLUMBIA, May 19, 1922, (E. G. Vanatta; from Bald Eagle's nest), [A.N.S.P., no. 6288].

Paratypes.—1 ♂, 1 ♀; topotypical with same data. 1 ♂, 2 ♀; Swarthmore, Delaware County, PENNSYLVANIA, June 18, 1905, June 10, 1906, July 4, 1907, (E. T. Cresson, Jr.).

An Annotated List of The Butterflies of Nebraska (Lepid.: Rhopalocera).

By R. A. LEUSSLER, Omaha, Nebraska.

(Continued from page 9.)

19. EUCHLOE AUSONIDES (Bdv.) race COLORADENSIS (Hy. Edw.). Apparently confined to the western part of the state, where it flies on the pine-clad slopes. Sioux County, May 27 and July 10, 1900 (Wolcott) and June 5, 1919 (Leussler). The form found here is identical with that found in the Front Range, Rocky Mountains, Colorado. It differs from the Pacific Coast form in the smaller size, and more slender discal black spots of primaries.

20. ZEGRIS OLYMPIA (Edw.) race ROSA (Edw.). Rare. One specimen, Omaha, May 4, 1926, 1 from Omaha, May 24,

1929, and 1 from Plattsmouth, May 13, 1936. All 3 specimens are race *rosa,* distinguished by the very lightly marked apices in contrast with the more heavily marked apices noted in a long series from the sand dunes at Millers, Indiana. The late E. A. Dodge also reported collecting a specimen in Dodge County.

21. ANTHOCARIS MEDEA (Hbn.). I have seen no individuals actually on the wing in Nebraska. However, Dr. Wolcott found a specimen in a small collection of local butterfflies made at Crete, which was said to have been captured there by the owner of the collection. Prof. Lawrence Bruner also reported having taken specimens near Omaha years ago.

22. CATOPSILIA SENNAE (L.). Typical *sennae* is rare in Nebraska. One specimen, near Omaha, September 19, 1914, closely resembles Texas specimens in the peculiar shade of yellow, flushed on secondaries with orange, and with the margins heavily edged with brown.

C. SENNAE form EUBULE (L.). Fairly abundant as a rule in the eastern part of the state. August and September. Omaha, Lincoln, Roca, Papillion and Kearney.

C. SENNAE form ♀ PALLIDA (Ckll.). Rare. One specimen, very pale creamy-white with heavy brown margins, taken in copula with a male of *eubule,* Plattsmouth, August 12, 1931. Another, pale greenish yellow with heavy brown margins, Omaha, September 29, 1933.

23. C. AGARITHE (Bdv.). One male, taken at Glencoe, Dodge County, by the late E. A. Dodge in the summer of 1876, and now in the writer's collection. Undoubtedly a straggler.

24. C. PHILEA (Joh.). One male, taken at Plattsmouth, August 12, 1931. Wings somewhat frayed, suggesting long flight. No doubt a straggler.

25. AMYNTHIA MAERULA (F.). One female taken at Omaha, September 20, 1921 (Leussler). This is not *clorinde* (Godt.) nor *maerula* (Hbn). It agrees perfectly in size and shape with the figure of *maerula* (F.) in Seitz. It is a pale, dirty yellowish-white, quite different from the ground color of *clorinde* and it lacks the orange splash on the primaries of the

latter. The brown spot on primaries is identical with that in Seitz's figure, and the spot on secondaries is pale orange, circled with brown, not brown surrounded by orange as in *clorinde,* The under side is decidedly more green that *clorinde,* and the median spots are white bordered with reddish, altogether different from those of *clorinde.* It fits perfectly the description of the female *maerula* (F.) as set forth in the text in Seitz. The wings are somewhat frayed showing long flight. This species is not listed in Barnes and Benjamin's check list, and has not, so far as I am aware, been recorded from north of the Mexican border.

26. KRICOGONIA LYSIDE (Godt.). Another straggler. One battered specimen, taken at Roca, May 10, 1911.

27. ZERENE CAESONIA (Stoll). Fairly common in the eastern part of the state. The first brood in June, the second, in August and September. Has also been taken near Harrison, in the northwestern part of the state. The species is quite variable in the amount of orange flushing on secondaries and in the width and form of the black border on secondaries.

Z. CAESONIA gen. auctum. ROSA (M'Neill). Some splendid examples of this form found in September and October. Not all the individuals of the fall brood have the under side of secondaries pink, but most of the females have more or less. In some the under side of secondaries is solidly pink. Apparently form *rosa* is confined to the female sex, for although common among the females of the fall brood I have seen no males which I could refer to this form. The males of the fall brood which correspond to the female *rosa* in their tendency toward pink under side apparently are form *rosea* (Roeber). The pink on the under side of the males is confined, besides the laving at apex of primaries, to two streaks radiating from the base of secondaries, a series of irregular shaped small spots forming a band parallel to outer margin of secondaries, a similar series on primaries not quite reaching the inner margin. The edge of both wings is also narrowly margined with pink. On the upper side the black border of hind wings is replaced by narrow streaks which are broadened at the end of veins, forming an inverted T. A percentage of females of the fall

brood also possess all of these characters.

Z. CAESONIA ab. IMMACULSECUNDA Gunder. Two females, Omaha, October 3, 1928. One male, Omaha, September 29, 1933, has slight vestiges of marginal border, thus approaching *immaculsecunda.*

28. EURYMUS EURYTHEME (Bdv.). Common over entire state. The spring form of this species in the eastern part of the state is what has been known as *keewaydin,* occasional specimens approaching *ariadne* in the restricted amount of orange on primaries. On the other hand many show almost as much orange as *amphidusa,* and intergrades of every degree are found. Albinic females (ab. *alba* Stkr.) also are found in the early generation.

E. EURYTHEME form AMPHIDUSA (Bdv.). One of our commonest butterflies. Wherever there is a clover or alfalfa field swarms of this butterfly will be found. June to October. Albinic females (ab. *alba* Stkr.) are now much more common than formerly. During August and September individuals of both sexes in which the ground color is pure yellow (ab. *flava* Stkr.) are not uncommon.

E. EURYTHEME form ERIPHYLE (Edw.). Found in the western part of the state. Specimens from Banner and Sioux Counties.

29. E. PHILODICE (Godt.). Fairly common in the eastern part of the state, though less so than the preceding species, and also less common than formerly. Albinic females (*alba* Stkr.) are occasionally found but are rather rare. Orange tinted individuals (ab. *hybrida* Stkr. = *luteitincta* Wolcott) are also found. The latter have been taken at Omaha, April 10, 1910; June 19 and 26, 1910; Blair, September 19, 1920.

E. PHILODICE gen. vern. ANTHYALE (Hbn.). Small, extremely narrow-bordered individuals have been taken at Omaha, Cedar Bluffs and Harrisburg.

30. E. ALEXANDRA (Edw.). This handsome species is found in the western part of the state. I have taken it in abundance in the vicinity of Harrison.

E. ALEXANDRA race EDWARDSII (Edw.). Rare. One specimen, Warbonnet Canyon, June 24, 1901. (Merritt Cary); 1, Monroe Canyon, August 18, 1912; 1, June 16, 1929.

31. EUREMA MEXICANA (Bdv.). Found in fair numbers throughout the state in late September and early October; occasionally also in June. Has been taken at Omaha, Lincoln, Roca, Meadow, Fremont and Harrison.

32. E. NICIPPE (Cram.). Rare. Single individuals have been taken at Omaha, Lincoln, Roca, Cedar Bluffs and McCook.

33. E. LISA (Bdv. and Lec.). Common over the greater part of the state. Apparently two broods, July to October. Occasional females are found which are very pale, almost white (form ♀ alba Stkr.). These albinic females I have found only in the fall.

34. DANAUS MENIPPE (Hbn.). Common over the entire state, particularly so in late summer and fall, although it makes its appearance as early as April and May. One dwarfed specimen of ab. *fumosus* (Hlst.) was taken at Omaha, July 8, 1910.

(To be continued.)

OBITUARY

DR. GEORGE HENRY FALKINER NUTTALL, emeritus professor of bioloby at the University of Cambridge and lately director of the Molteno Institute for Research in Parasitology, died on November 16, at the age of seventy-five years (*Science*, December 24, 1937, p. 581.)

Among his well-known publications are: On the rôle of insects, arachnids and myriapods as carriers in the spread of bacterial and parasitic diseases of man and animals (John Hopkins Hospital Reports VIII, 1899), Studies in relation to Malaria: The structure and biology of Anopheles (Journal of Hygiene, i-iii, 1901-03) with A. E. Shipley, The part played by Musca domestica and allied (non-biting) flies in the spread of infective diseases (Rept. to Local Gov't. Board of Public Health, &c., London n. s. no. 16, 1909) with F. B. Jepson, and Ticks, a monograph of the Ixodoidea, parts I and II, with Cecil Warburton, Cambridge, England, 1908, 1911. Many of his papers in this field appeared in *Parasitology*, a journal which he founded in 1908 and of which he was editor for twenty-five years.

Current Entomological Literature

COMPILED BY V. S. L. PATE, LAURA S. MACKEY and E. T. CRESSON, Jr.

Under the above head it is intended to note papers received at the Academy of Natural Sciences, of Philadelphia, pertaining to the Entomology of the Americas (North and South), including Arachnida and Myriopoda. Articles irrelevant to American entomology will not be noted; but contributions to anatomy, physiology and embryology of insects, however, whether relating to American or exotic species will be recorded.

This list gives references of the current or last year unless otherwise noted. All continued papers, with few exceptions, are recorded only at their first installment.

For records of Economic Literature, see the Experiment Station Record, Office of Experiment Stations, Washington. Also Review of Applied Entomology, Series A, London. For records of papers on Medical Entomology, see Review of Applied Entomology, Series B.

Note. References to papers containing new forms or names not so stated in titles are followed by (*); if containing keys are followed by (k); papers pertaining exclusively to neotropical species, and not so indicated in the title, have the symbol (S) at the end of the title of the paper.

The figures within brackets [ ] refer to the journal in which the paper appeared, as numbered in the list of Periodicals and Serials published in our January and June issues. This list may be secured from the publisher of Entomological News for 10c. The number of, or annual volume, and in some cases the part, heft, &c., the later within ( ) follows; then the pagination follows the colon :

Papers published in the Entomological News are not listed.

GENERAL.—Barnes, H. F.—Recent advances in Science. Entomology. [Sci. Progr.] 32: 542-547. **Betrem, J. G.**—Modern Entomologisch Onderzoek. [Handel. Zev. Nederland.—Indisch Natuurw. Cong. Gehouden Bativia van 23-26 Oct. 1935] p. 539-549. **Carpenter, J.**—Daily fluctuations in insect populations in the prairie forest ecotone of No. Amer. [C. R. XII Congr. Internat. Zool.] 2: 969-980, ill. **Cowley, J.**—Quantitative methods of local entomofaunistic survey. [9] 71: 8-12. **Hayward, K. J.**—Further records of insect migration in the Argentine republic. [9] 71: 6-7. **Hincks, W. D.**—A plea for better citation of synonymy. [8] 74: 13-14. **d'Orchymont, A.**—Changements de noms de genres. L' "Opinion" 11. [33] 77: 423-432. **Schneider, H.**—Fangreisen in Uruguay. La Sierra de las Animas. [17] 55: 97-102; 109-112; 128-131, ill.

ANATOMY, PHYSIOLOGY, ETC.—Albertson. G. W.—A morphological study and comparison of the mouth parts of some Hymenoptera. [Contrib. Biol. Lab. Catholic Univ. Am.] 1921: 5-59, ill. **Anon.**—Chromosomes of Pyrgomorphinae. [Cur. Sci.] 6: 307. **Anon.**—The occurrence of v-shaped centrioles in the spermatocytes of some neuropteran insects. [Cur. Sci.] 6: 307. **Becker, E.**—Eine gut analysierbare pigmentablagerung in liesegangschen ringen bei insekten. [Forsch. und Fortsch.] 14: 9-11, ill. **Claus, A.**—Vergleichendphysiologische Untersuchungen zur Okologie

der Wasserwanzen mit besonderer Berichtigung der Brackwasserwanze. [89] (All. Zool.) 58: 365-432, ill. **Barth, R.**—Herkunft, Wirkung und Eigenschaften des weiblichen sexual duftstoffen einige Pyraliden. [89] (All. Zool.) 58: 297-329, ill. **v. Frankenberg, G.**—Die erste Fullung der Tracheen bei Culex und Corethra. [89] (All. Zool.) 58: 175-180, ill. **Ghidini, G. M.**—Le ghiandole della seta del Bombyx mori nel periodo maturativo e postmaturativo. [Bull. Zool., Italy] 8: 193-209. **Grandi, G.**—Morfologia ed etologia comparate di Insetti a regime specializzato. XII. Macrosiagon ferrugineum flabellatum. [Boll. Ist. Ent. Bologna] 9: 33-64, ill. **Guibe, J.**—Etude de l'aile chez Apterina pedestris (Sphaerocer.). [Bull. Soc. Z. France] 61: 266-273, ill. **Guye, C. E.**—Sur le bruit que produit un essaim d'insectes bourdonnants. [Arch. Sci. Phys. Nat.] 142: 53-70, ill. **Hebredey, K. F.**—Beitrag zum Bau des Subelytral raumes und zur Atmung der Coleopteren. [46] 33: 667-734, ill. **Henke, K.**—Versuch einer vergleichenden morphologie des flugelmusters der Saturniden auf entwicklungs-physiologischer grundlage. [Nova Acta Leopoldina.] 4 (18): 137 pp., ill. **Hilton, W. A.**—Nervous System and Sense Organs. LXV.—Isoptera. LXVI.—Mallophaga. LXVII.—Anoplura. LXVIII.—Corrodentia. LXIX.—Embidina. [13] 29: 88-99, ill. **Janda, V.**—Beitrage zur Kenntnis des Umfarbungsprozesses bei "Chrysopa vulgaris" (Neuropt.). [C. R. XII Congr. Internat. Zool.] 2: 1463-1471. **Johnson, M. W.**—A study of the nucleoli of certain insects and the crayfish. [Journ. Morph.] 62: 113-139, ill. **Kangas, E.**—Ein Fall von anomaler Fuhlerbildung bei Comber connata (Hymen., Tenthredin.) [Ann. Ent. Fenn.] 3: 150-153, ill. **Krey, J.**—Untersuchungen zur Okologie und Physiologie der Trichopterenlarven. II. Teil. Uber die Bedeutung der Wasser stoffionkonzentration fur die Physiologie von Trichopterenlarven verschiedener okologischer Valenz. [89] All. Zool.) 58: 201-224, ill. **Langner, E.**—Untersuchungen an Tegument und Epidermis bei Diplopoden. (Mit Beitragen zu Sehorganen und Hautdrusen). [89] Abt. (Anat) 63: 483-541, ill. **Lengerken, H. V.**—Studien uber die Lebenserscheingungen der Silphini (Coleo.). [46] 33: 654-666, ill. **Lison, L.**—L'appareil pulsatile du tube de malpighi chez Tenebrio molitor. [Soc. Roy. Zool. Belgique] 67: 41-49, ill. 1936. **Mahdihassan, S.**—Die Struktur des Stocklacks und der Bau der Lackzelle. [46] 33: 527-554, ill. **de Mello-Leitao, C.**—see under Arachnida. **Millot, J.**—Le sens du gout chez les Araignees. Metamerisation et

musculature abdominale chez les Araneomorphes. [Bull. Soc. Z. France] 61: 27-38; 181-204, ill. **Mosebach-Pukowski, E.**—Uber die Raupengesellschaften von Vanessa io und V. urticae. [46] 33: 338-380, ill. **Muschamp, P. A. H.**—Gynandromorphism in Diptera [21] 50:2. **Naumann, F.**—Zur Reduktion der Saugrussels bei Lepidopteren und deren Beziehung zur Fluegelreduktion. [89] (Syst.) 70: 381-420, ill. **Park, T.**—A note on the size & composition of old Tribolium confusum populations. [90] 72: 24-33. **Poll, M.**—Note sur les tubes de Malpighi des larves de Tenthredinoides. [33] 77: 433-442, ill. **Rietschel, P.**—Bau und Funktion des Wehrstachels der Staatenbildenden Bienen und Wespen. [46] 33: 313-357, ill. **Scott, A. C.**—Paedogenesis in the Coleoptera. [46] 33: 633-653, ill. **Sen, Sirsir.**—On the mechanism of feeding in blood-sucking Acari, and its relationship with that of blood-sucking Diptera. [C. R. XII Congr. Internat. Zool.] 3:1584-1587, ill. **Sioli, H.**—Thermotaxis und Perzeption von Warmestrahlen bei der Bettwanze (Cimex lectularius). [89] (All. Zool.) 58: 284-296, ill. **Smith, S. G.**—Cytology of spruce sawfly and its control in eastern Canada. [31] 141:121. **Spotkov, E. M.**—The centriole in the parthenogenetic and fertilized eggs of Habrobracon juglandis. [Journ. Morph.] 62: 49-89, ill. **Stage, Gjullin & Yates.**—Flight range and longevity of flood-water mosquitoes in the lower Columbia River valley. [12] 30: 940-945, ill. **Svajkovskij, I.**—Aerodynamische eigentumlichkeiten der insekten. [Comptes Rendus Acad. Sci. U. S. S. R.] 17: 77-80, ill. **Tiensuu, L.**—Anomalous Mayfly Individuals (Ephemerida). [Ann. Ent. Fenn.] 3: 217-223, ill. **Vandel, A.**—L'evolution de la parthogenese naturelle. [C. R. XII Congr. Internat. Zool.] 1: 51-64. **Verhoeff, K. W.**—Die Perioden der Hautungs Zeit bei den Chilognathen. [46] 33: 438-444.

ARACHNIDA AND MYRIOPODA.—**Clark, A. H.**—On some Onychophores from the W. Indies & Cent. Amer. [50] 85: 1-3, (*). **da Fonseca, F.**—Remarks on the tick Spelaeorhynchus latus. [C. R. XII Congr. Internat. Zool.] 3: 1580-1583. Occurrence of a new subsp. of Ixodes ricinus in the state of S. Paulo, Brazil. [C. R. XII Congr. Internat. Zool.] 3: 1588-1592, ill. "Ixodes amarali," n. sp. [C. R. XII Congr. Internat. Zool.] 3: 1593-1596, ill., (S). N. gen. & spp. of Acari Laelaptidae from Brazilian rodents. [C. R. XII Internat. Congr. Internat. Zool.] 3: 1597-1615, ill. **Gerhardt & Kastner.**—Ordnung der Arachnida: Araneae

Echte spinnen webspinnen. [Kukenthal & Krumbach Handb. Zool.] 3, 2 (2): 394-496, ill. **Holm, A.**—Notes on the spider fauna of East Greenland. [83] 29 (B12) 1-2. **Jacot, A. P.**—Some new western N. Carolina moss-mites. [10] 40: 10-15. **Lundblad, O.**—Funfte mitteilung uber neue wassermilben aus Santa Catharina in Sudbrasilien. [34] 120: 280-293. **de Mello-Leitao, C.**—La distribution des Arachnides et son importance pour la zoogeographie Sud-Americaine. [C. R. XII Congr. Internat. Zool.] 2: 1209-1216, ill. Distribution et Phylogenie des Faucheurs Sud-Americaines. [C. R. XII Congr. Internat. Zool.] 2: 1217-1228, ill. **Schulze, P.**—Durch Raummangel bedingte Hemmungserscheinungen an einzelnen Korperteilen in der Ruhenymphe der Ixodiden und das Auftreten entsprechender Bildungen als Art- und Gattungsmerkmal. [46] 33: 445-495, ill. **Verhoeff, K. W.**—Ungewohnliche Diplopodenhautungen und ihre phylogenetisch Bedeutung. [46] 33: 290-296.

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SPECIAL NOTICES.—Die Palearktischen Colletes-arten.—J. Noskiewicz. Prace Nauk. Wydaw. Towarz. Nauko We Lwowie. 529 pp., ill.

GENETICS AND THE ORIGIN OF SPECIES. By THEODOSIUS DOBZHANSKY, Professor of Genetics, California Institute of Technology. Columbia University Press, New York, N. Y. pp. xvi + 364. 22 illus. $3.60.

This volume presents an astonishingly lucid account of those facts and theories of modern genetics that bear upon the mechanism of organic evolution. Gene mutations and the genetically and cytologically verifiable rearrangements occurring in the structure of the chromosomes are shown to supply the raw material for evolution. The study of these changes together with the study of the effects of geographical isolation and of natural selection appears to bring us much closer than we have ever been before to an understanding of the way in which evolution has come about. The statement frequently heard a few years ago, that genetics deals only with the inheritance of abnormalities occurring in laboratory animals can no longer be successfully defended. Much of the present volume deals with the genetical analysis of differences between various species and races of insects as they are found in nature, combined with careful studies of the geographical distribution of the forms involved. One cannot consider the facts here so clearly presented without feeling that genetics is making a real contribution to our understanding of the problem ot race and of species formation. At present the degree of difference recognizable in the structure of the chromosomes is not always correlated with the degree of differentiation in the systematic rank of the forms in question, nor can chromosome morphology or chromesome number be always so correlated. Nevertheless there is also so much information of a positive nature that there is at present a greatly improved outlook for the hope that "the tracing of phylogenetic relationships is to become at long last an exact procedure instead of the expression of the opinion of the particular investigator." To those interested in phylogenetic and in systematic studies this book will be of especial interest. Systematists have developed some fairly definite ideas regarding the evolution of races and species and regarding the rôle of isolation in effecting evolutionary differentiation. These ideas, which they have developed, often through a kind of intuitive understanding of their observations, are extensively confirmed and augmented by the rigorous analytic methods of genetics, albeit expressed in a different terminology and based largely on a different type of evidence. In addition, genetical theories offer a good explanation of the evolution of non-adaptive racial and specific characteristics, of those features so

much used for diagnostic purposes in taxonomy but which have always been inexplicable on the basis of natural selection and which have always been an embarrassment to all good Darwinians.—R. G. SCHMIEDER.

SOURCE BOOK OF BIOLOGICAL TERMS. By AXEL L. MELANDER. The College of the City of New York, 160 pp. 8vo. 1937. $1.10.—This book well covers the ground suggested by its title. The author, introducing this book says: "One of the disciplines of the study of Biology is the acquaintance of a technical vocabulary. Each term incorrectly used becomes responsible for an ever widening circle of faulty repetition. The language of Biology seems strange to beginning students because most of the terms used are of Greek or Latin extraction but when such words are given a meaning the student realizes that nomenclature is a help and not a hindrance to his study." An idea of the ground covered in this book can be gleaned from a perusal of the table of its contents. Here we find chapters on biological nomenclature, the romance of taxonomic names, classical sources for names, evolution of word meanings; how words originate, their phylogeny, homologies and how they change in passing from one language to another; words of uncertain and mistaken derivations; how some words are derived from ancient customs, biological beliefs, divinations and early anatomical conceptions; words based on unnatural history, on color and terms relating to education. Further we have chapters on accentuation, pronunciation of taxonomic terms, mispronunciations, suffices, prefixes, plurals, the Greek alphabet, derivations of biological terms and lastly one on some pertinent definitions. All this we have in sixty-one pages. In part two of ninety-five pages is an alphabetical list of many components of biological vocabulary.—E. T. CRESSON, Jr.

PROCEDURE IN TAXONOMY. By EDWARD T. SCHENK and JOHN H. MCMASTERS. Stanford University Press. 72 pages, 8 vo. Publication date, February 26, 1936. Price $2.00.—This book was prepared to supply the student as well as the professional systematist with the principles of taxonomy. The contents are grouped into chapters on systematic categories, types, descriptions of new species, specific names, synonyms, storage of type material, Latin names and abbreviations; with an appendix giving the rules and opinions of the International Commission on Zoological Nomenclature. The title "Procedure in Taxonomy", however, gives rather an erroneous im-

pression of what one would expect. One might say that Procedure in Paleontological Taxonomy would have been a better title, as palaeontology is its background, and many of the illustrations, forms and references savor of this science. However, judging from the poorly constructed descriptions and revisions one finds in the great mass of the literature of today, many students and authors of zoology will find very profitable reading in this little book. A commendable feature is the index to the rules and opinions of the zoological commission. This alone enhances its value to zoological taxonomists. The writer of this notice does not concur in many of the recommendations, and there are many to which others will take exception; but on the whole these are of rather minor importance as compared with the general commendations.—E. T. CRESSON, Jr.

THE MALE GENITALIA OF ORTHOPTEROID INSECTS. By R. E. SNODGRASS. Smithsonian Miscellaneous Publications, Vol. 96, No. 5. Pp. 1-107, 42 figs. Washington, September 25, 1937.—The Introduction, of 11 pages, begins: "The order Orthoptera . . . includes at least the Mantoidea, Blattoidea, Tettigonioidea and Acridioidea. The group unity of these forms is attested in the structure of the male reproductive system by the compounding of the so-called accessory genital glands that appear, in the adult condition, to arise from the inner end of the ductus ejaculatorius, but which in their development are outgrowths of the mesodernal coelomic ampullae into which the vasa deferentia discharge. Closely associated with the true Orthoptera by the same feature of the male genitalia are the Termitidae, Embiidae, Grylloblattidae, Phasmatidae and probably the Zorotypidae. On the other hand, the Plecoptera and the Dermaptera would appear to be distinct orders having no close relationship with the Orthoptera, since in each of these groups the male reproductive system is specialized in its own way, and shows none of the features characteristic of the orthopteroid insects." Following this is a summary of the development of the male gonads, based largely on Nelson's work on *Melanophus*, of the male genital ducts and of the external genitalia. Then nine sections are devoted to the Isoptera, Embioptera, Zoraptera, Grylloblattoidea, Phasmatoidea, Mantoidea, Blattoidea, Tettigonioidea and Acridoidea respectively, those on the Blattoidea (22 pp.) and the Tettigonioidea (38 pp.) being the most extensive. In each section the previous literature is summarized and original observations and illustrations by the author are added.—P. P. CALVERT.

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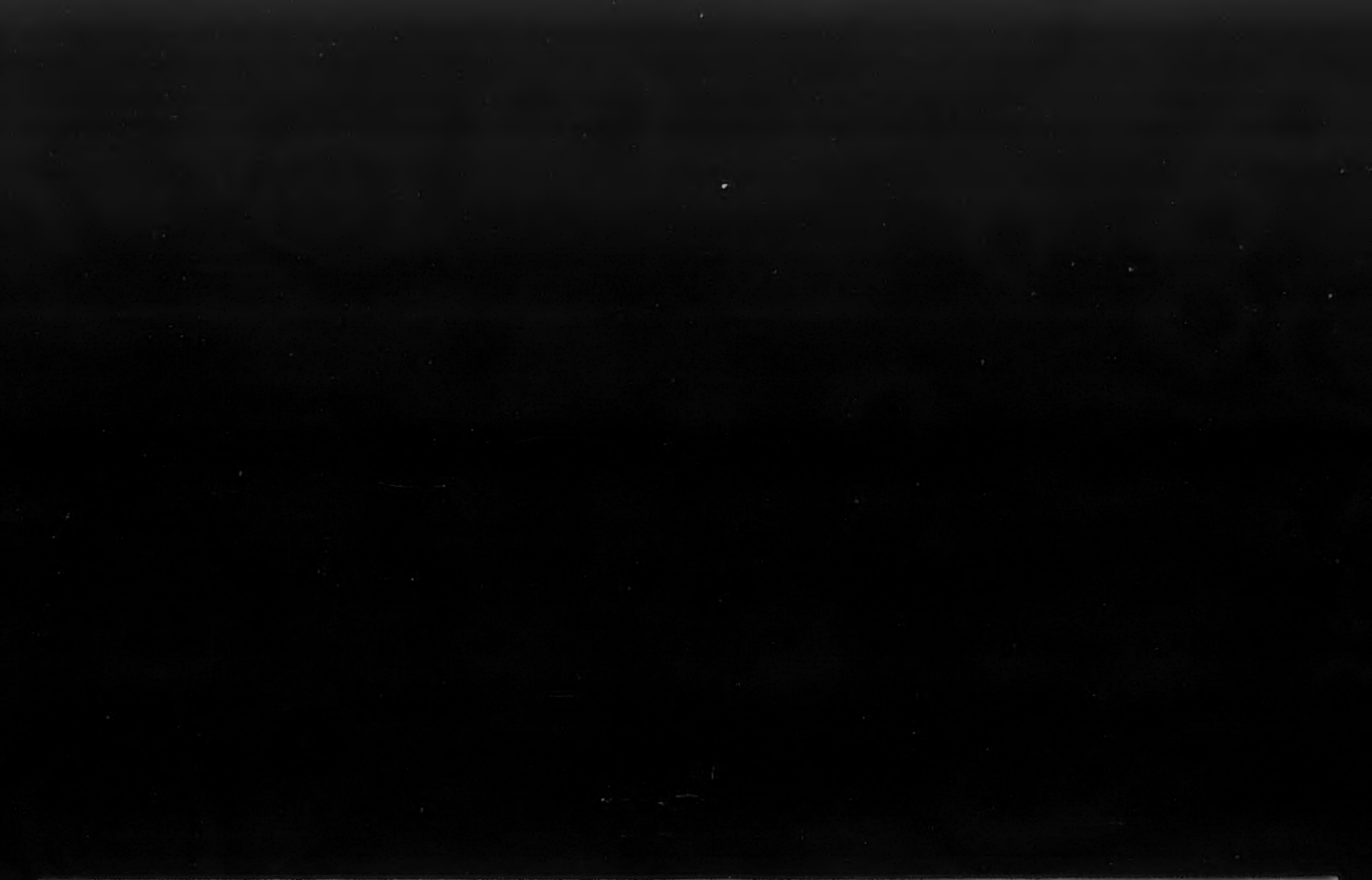
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